

AMENDMENTS TO THE SPECIFICATION:

Please replace the title with the following amended title:

~~IMPROVED PERSONAL CARE DEVICE~~ HAIR DRYERS WITH THERMAL
FEEDBACK AND OPERATING CONDITIONS DISPLAY

Kindly replace the paragraph beginning at page 1, line 4, with the
following amended paragraph:

The present invention relates to ~~personal care devices~~ hair dryers and, more particularly, to ~~personal care devices~~ hair dryers provided with heating elements and a motor driven fan. This invention also relates to ~~hair care devices~~ dryers with a liquid crystal display (LCD) device. More specifically, although of course not solely limiting thereto, this invention relates to hair dryers and fan heaters with over-temperature protection and operating conditions display.

Kindly replace the paragraph beginning at page 1, line 11, with the
following amended paragraph:

~~Personal care devices~~ Hair dryers with heating elements and a motor driven fan are generally used to enhance personal comfort or personal grooming.

Kindly replace the paragraph bridging pages 1 and 2, with the following
amended paragraph:

For example, a ~~hair care device~~ dryer ~~such as a hair dryer or a hair curler~~ with a heater and a motor driven fan provides a convenient and localized heating source

with forced air circulation so that warm air can be delivered for hair care and styling within a short time. In such applications, a wide range of heating power level variation and fan-speeds is usually required in order to meet with the specific personal comfort or grooming requirements. For example, a high heating power level with a high fan-speed may be required to blow dry and style wet hair while a low or moderate heating level and a moderate fan-speed may be required for gentle hair styling.

Kindly replace the paragraph beginning at page 2, line 7, with the following amended paragraph:

To accommodate such a wide range of operating power requirements, heating elements provided in such ~~personal care devices~~ hair dryers must be able to operate on a wide range of power output. The typical operating power ratings of such heating elements are usually in the region of a few hundred Watts to a maximum of 2,000 - 3,000 Watts.

Kindly replace the paragraph bridging pages 2 and 3 with the following amended paragraph:

~~Personal care devices~~ Hair dryers of this type usually include a main housing defining an air-passageway having an air-inlet and air-outlet. The heating element is generally disposed intermediate between the air-inlet and the air-outlet so that the downstream air will be warmed or heated up before leaving the ~~device~~ hair dryer for hair styling or other appropriate applications. These ~~personal care devices~~ hair

dryers are usually provided with user control interfacing means such as a control knob or a rocker switch with a plurality of heating level and fan-speed settings. The heating level setting is usually graduated with discrete levels and calibrated on the assumption that air will pass through the air-passageway unobstructed. Under such an assumption the heated air exiting from the nozzle or air-outlet at a pre-determined setting will be at a reasonably constant, usable, and safe temperature. However, this is not always the case and the temperature of the heating element can be substantially elevated when the exit air passageway is blocked, for example, when the air-outlet or nozzle is placed too close near the head of the user or other blocking surfaces. This undesirable obstruction of airflow through the passageway adversely increases the temperature of the heating element because of insufficient ventilation and may result in personal injuries as well as fire hazards. Hence, it will be desirable if an improved safety protection means can be provided to such ~~personal care devices~~ hair dryers to alleviate or avoid risks of personal injuries of fire hazards associated with the use of such ~~devices~~ hair dryers.

Kindly replace the paragraph beginning at page 3, line 10, with the following amended paragraph:

Furthermore, while such ~~personal care devices~~ hair dryers are provided with user selectable switches graduated with discrete levels for setting the operating conditions, such controlling knobs are usually in the form of rocker switches which do not provide the user with any useful and indicative operating information. Hence, it will be desirable if useful information can be conveyed to the user by means of an improved scheme and by way of improved means.

Kindly replace the paragraph beginning at page 3, line 17, with the following amended paragraph:

Accordingly, it is an object of the present invention to provide ~~personal care devices~~ hair dryers such as ~~hair dryers~~, hair blowers, hair curlers and fan-heaters with safety and protective means are provided to alleviate the risk of personal injuries or fire hazards due to over-temperature resulting from adverse or inappropriate operation conditions of the ~~devices~~ hair dryers.

Kindly replace the paragraph beginning at page 4, line 1, with the following amended paragraph:

It is another object of the present invention to provide improved ~~personal care devices~~ hair dryers with schemes and means for visually conveying the operating conditions of the ~~device~~ hair dryer to the user to facilitate enhanced interactive operation between the user and the ~~device~~ hair dryer. As a minimum, it is an object of the present invention to provide improved ~~personal care devices~~ hair dryers such as ~~hair dryers~~, hair blowers, air curlers and fan-heaters as an alternative choice to the general public.

Kindly replace the paragraph beginning page 4, line 8, with the following amended paragraph:

According to a first aspect of the present invention, there is provided a ~~personal care device~~ hair dryer such as ~~a hair dryer~~ or a fan-heater including a main housing, a motor, a motor driven fan, a heating element, controlling means, a

thermal sensor, said main housing defines an air-passageway having an air-inlet and an air-outlet, said heating element is disposed intermediate between said air-inlet and said air-outlet, said thermal sensor is disposed adjacent to said air-outlet and provides temperature information to said controller, said controlling means includes memory for storing temperature information and said controlling means includes means for comparing said temperature information received from said thermal sensor with the pre-stored temperature information, said controlling means causes said heating element to reduce heating power output according to a pre-determined manner when the received temperature information corresponds to a temperature which exceeds a pre-determined threshold, said non-dissipative power reduction scheme including selectively turning on and off of said heating elements alternately and repeatedly at zero-crossings of an alternate current power supply during power reduction operation.

Kindly replace the paragraph beginning at page 4, line 21, with the following amended paragraph:

According to a second aspect of the present invention, there is provided a ~~personal care device~~ hair dryer such as a ~~hair dryer~~, a hair blower, a hair curler and a fan-heater having display means on said main housing indicating the instantaneous operating conditions of said ~~device~~ hair dryer.

Kindly replace the paragraph beginning at page 6, line 6, with the following amended paragraph:

Referring firstly to the hybrid circuit and block diagram of Fig. 1 and the partially exploded drawing of Fig. 7, there is shown an application in which a thermal sensing means is utilized for automatic thermal feedback to control the operation of the heating elements of a hair dryer **10** as an example. The circuit arrangement includes a thermal sensing frontend circuitry **100**, a synchronization circuitry **110** for synchronizing with the alternating current supply to which the hair dryer is connected, controlling means **120** which is a micro-controller unit ("MCU") in the present example, a first heating element **130** and a second heating element **140** which are connected in parallel and individually switchable. In addition, the hair dryer of Fig. 7 comprises a built-in ionizer **2610** having an ionizing circuit **261**. It will become apparent from the description below that the output heating power of the hair dryer can be flexibly and sophisticatedly varied by selective turning on the individual heaters during different times of the cycles of the alternating current power supply.

Kindly replace the paragraph beginning at page 12, line 8, with the following amended paragraph:

Referring to Fig. 3 in which a second control and display circuitry of a preferred embodiment of the hair dryer is shown, the hair dryer circuit includes a motor **280** with a parallelly connected switchable shunt resistor controllable by the switch SW2 **250** for speed variation and a switchable ~~ionising~~ ionizing circuitry providing ~~ionised~~ ionized warm air to the hair for styling. In addition, a heater level control switch **260** SW1 switchable to a plurality of discrete heating power level

settings are also shown. The operating conditions of the switch SW2 **250**, the ~~ionising~~ ionizing circuit **261**, and the heating level SW1 switch are connected to the input ports of a MCU. The output of the MCU is connected to a display means **270** for displaying the operating conditions of the hair dryer.

Kindly replace the paragraph beginning at page 12, line 18, with the following amended paragraph:

For example, when the shunting switch SW2 **250** is closed, corresponding to a lower motor speed, the terminal of SW2 will be pulled high and the input port PB3 of the MCU **220** will detect a low signal because of the inverted circuit connected between the input port PB3 and the switch SW2 **250**. Similarly, the MCU **220** can detect whether the ~~ionising~~ ionizing circuitry is in operation by detecting whether the serial switch "IONIC SW" **262** is closed or opened. When IONIC SW **262** is closed, this terminal is at a high potential and the input port PB4 of the MCU **220** will detect a low signal. Similarly, when the heating power level selector switch SW1 **260** is set to the "high" setting corresponding to a high power output, the input port PB1 of the MCU **220** will detect a low signal while the other input port PB0 will remain high. On the other hand, when the switch SW1 **260** is set to the "low" setting, the input at PB0 of the MCU will be pulled low and the input port PB1 will remain high. Thus, by scanning the conditions of the input ports PB0 and PB1, the MCU can decide the instantaneous heating power level setting and transmit information concerning the operating condition to the display means. The display means can be, for example, a

LCD or other appropriate displays, includes a plurality of input nodes for connecting to the output nodes of the MCU.

Kindly replace the paragraph beginning at page 15, line 1, with the following amended paragraph:

Referring to Figs. 5 and 6, there is shown a hair dryer with a second preferred embodiment of control and display means **370**. In this hair dryer, the usual essential features of hair dryers are similarly provided and will not be discussed in detail. This hair dryer includes a plurality of progressive or gradual control switches SW1-SW6 separating into three groups, namely, SW1 and SW2, SW3 and SW4, SW5 and SW6. For example, the switches **360** SW1 and SW2 correspond to the heating element control, SW3 and SW4 **350** correspond to the fan-speed control and SW5-SW6 **361** correspond to the ionizer control. When SW1 is pressed, the MCU will progressively increase the heating power output until SW1 is released. On the other hand, when SW2 is depressed, the MCU will control the heating elements to reduce the heating power output until SW2 is released. When neither SW1 nor SW2 is depressed, the hair dryer will continue operating in its present state. Likewise, when SW3 is depressed, the MCU will increase the fan-speed until SW3 is released or when maximum speed has been reached. Similarly, when SW4 is depressed, the MCU will cause the fan-speed to decrease until the motor stops or until the switch is released. The ~~ionising~~ ionizing control switches SW5 and SW6 work generally under the same principles.